Long term economic consequences of child maltreatment: a population based study.

Thielen, F.W.; ten Have, M.; de Graaf, R.; Cuijpers, Pim; Beekman, A.; Evers, S.; Smit, F.

published in
European Child and Adolescent Psychiatry
2016

DOI (link to publisher)
10.1007/s00787-016-0850-5

document version
Publisher's PDF, also known as Version of record

Eur Child Adolesc Psychiatry (2016) 25:1297–1305
DOI 10.1007/s00787-016-0850-5

ORIGINAL CONTRIBUTION

Long-term economic consequences of child maltreatment: a population-based study

Frederick W. Thielen[1,2] · Margreet ten Have[1] · Ron de Graaf[1] · Pim Cuijpers[3] · Aartjan Beekman[4] · Silvia Evers[1,2] · Filip Smit[1,3,5]

Received: 3 August 2015 / Accepted: 11 April 2016 / Published online: 6 May 2016

Abstract Child maltreatment is prognostically associated with long-term detrimental consequences for mental health. These consequences are reflected in higher costs due to health service utilization and productivity losses in adulthood. An above-average sense of mastery can have protective effects in the pathogenesis of mental disorders and thus potentially cushion adverse impacts of maltreatment. This should be reflected in lower costs in individuals with a history of child maltreatment and a high sense of mastery. The aims of the study were to prognostically estimate the excess costs of health service uptake and productivity losses in adults with a history of child maltreatment and to evaluate how mastery may act as an effect modifier. Data were used on 5618 individuals participating in the Netherlands Mental Health Survey and Incidence Study (NEMESIS). We focussed on measures of child maltreatment (emotional neglect, physical, psychological and sexual abuse) and economic costs owing to health-care uptake and productivity losses when people with a history of abuse have grown into adulthood. We evaluated how mastery acted as an effect modifier. Estimates were adjusted for demographics and parental psychopathology. Post-stratification weights were used to account for initial non-response and dropout. Due to the non-normal distribution of the costs data, sample errors, 95 % confidence intervals, and p values were calculated using non-parametric bootstrapping (1000 replications). Exposure to child maltreatment occurs frequently (6.9–24.8 %) and is associated with substantial excess costs in adulthood. To illustrate, adjusted annual excess costs attributable to emotional neglect are €1,360 (95 % CI: 615–215) per adult. Mastery showed a significant effect on these figures: annual costs were €1,608 in those with a low sense of mastery, but only €474 in those with a firmer sense of mastery. Child maltreatment has profound mental health consequences and is associated with staggering long-term economic costs, rendering lack of action very costly. Our data lends credibility to the hypothesis that mastery may help to cushion the adverse consequences of child maltreatment. Further research on mastery may help to ameliorate individual burden and in addition offer some economic benefits.

Keywords Child maltreatment · Health service use · Productivity losses · Mastery · Internal locus of control

✉ Filip Smit
fsmit@trimbos.nl

1 Trimbos Institute Netherlands Institute of Mental Health and Addiction, Utrecht, P.O. Box 725, 3500 AS Utrecht, The Netherlands

2 Department of Health Services Research, Maastricht University, Maastricht, P.O. Box 616, 6200 MD Maastricht, The Netherlands

3 Department of Clinical, Neuro and Developmental Psychology, VU University, Amsterdam, van der Boechorststraat 1, 1081 BT Amsterdam, The Netherlands

4 Department of Psychiatry, VU University Medical Centre, Amsterdam, Oldenaller 1, 1081 HJ Amsterdam, The Netherlands

5 Department of Epidemiology and Biostatistics, VU University Medical Centre, Amsterdam, P.O. Box 7057, 1007 MB Amsterdam, The Netherlands

Introduction

Although the United Nations' 1990 convention on the 'Rights of the Child' stated that governments must ensure that children are "protected from all forms of violence, abuse, neglect and mistreatment" [1], maltreatment of

children remains a major issue [2]. The prevalence rates of child abuse and neglect vary greatly in the literature and also depend on the definitions and research methods used. Elsewhere, we report a yearly incidence of about 2.5 % of children that are victims of family violence [3], but the literature also reports higher rates ranging between 3.7 and 16.3 % [4, 5]. In the latter publications, the term 'severe violence' did not include events like slapping, hitting or grabbing, suggesting that the figures can be significantly higher when forms of 'minor violence' are included. Sexual abuse is estimated to have a prevalence of 8.7 % for boys and 25.3 % for girls in a meta-analytical study [6]. In our study, we define child maltreatment as emotional neglect as well as psychological, physical and sexual abuse before the age of 16.

There is overwhelming evidence that child maltreatment is associated with the onset of mental disorders [7–13], which, in turn, may entail substance use, unemployment and re-victimization [14, 15]. Therefore, child maltreatment is likely to be associated with long-term impacts that translate into higher rates of health service uptake as well as productivity losses by the time the victims of neglect and abuse have grown into adulthood.

Previous research has suggested that parental depression and anxiety can have an influence on child neglect [16, 17] and sexual abuse [18] and child abuse in general [19]. This is to say that parental psychopathology is intertwined with child maltreatment and can be viewed either as one of the causes or as a confounding factor in child maltreatment studies, of course depending on the study's research question.

Further evidence showed that an above-average sense of internal locus of control [20], also known as 'mastery', can have protective effects on the pathogenesis of mental disorders [21–23]. We therefore assume that mastery may cushion the adverse effects of neglect and abuse. Since mastery is amenable to change under therapeutic intervention [24, 25], this may offer an opportunity to alleviate both the health and economic burden caused by child maltreatment.

Although there are studies that examined health-care utilization and concomitant costs of adults who have been exposed to child maltreatment, these studies only examine a rather limited amount of abuse or neglect types. Information on a wider range of abuse types for both men and woman, while also taking the concept of mastery into account, and adjusting for parental psychopathology is lacking. The aim of our study is to calculate the excess costs of health service uptake and productivity losses in adults with a history of emotional neglect and psychological, physical and sexual abuse during childhood. In addition, we aim to assess how mastery can act as an amenable effect modifier to improve the prognosis. More specifically, our research questions are:

1. What are the long-term economic costs of child maltreatment with and without adjusting for demographics, concurrent forms of maltreatment and parental psychopathology?
2. How does the presence of a protective factor (mastery) interact with the adverse economic consequences of child maltreatment?

The latter may become a stepping stone towards proactive care and improve longer-term outcomes in people most in need of it.

Methods

Data were used from the first Netherlands Mental Health Survey and Incidence Study (NEMESIS), which is a large population-based cohort study [26]. NEMESIS collected data on (1) risk factors including child maltreatment, (2) DSM-III-R axis-I mental disorders and (3) on the costs generated by health-care uptake and productivity losses. Using the first two waves of NEMESIS permitted the prospective evaluation of the impact of risk factors such as child maltreatment (measured at baseline, t_0) on health-related costs (measured 1 year later at follow-up, t_1).

Participants and procedure

In NEMESIS, a random, stratified multistage sample was obtained in three steps. First, all Dutch municipalities ($N = 403$) were stratified by urbanization. From these strata, 90 municipalities were drawn randomly and proportionately. Second, within each selected municipality, households were randomly drawn from the postal register. Finally, the person with the most recent birthdate in each household was selected for interviews, provided that he or she was aged between 18 and 65 years and was sufficiently fluent in the Dutch language to be interviewed. Eligible persons, who were not immediately available, were contacted later in the year. The response rate for the sample at t_0 was 69.7 % ($N = 7076$) and followed the same multivariate distribution over age, sex, civil status and urbanity as the general Dutch population. Only men in the age bracket of 18–24 years were slightly underrepresented [27]. At the first follow-up (t_1), 79.4 % (N = 5618) continued to participate. Dropout was not related to having a disorder at t_0. However, younger males were still more likely to be lost to follow-up [27].

Measures

Socio-demographic characteristics considered for this analysis were gender (1 = female, 0 = male), age (in years,

Table 1 Socio-demographic characteristics (in %) based on exposure to child maltreatment ($N = 5618$)

	Total population (%)	Not exposed to child abuse (%)	Exposed to child abuse (%)
Gender			
Male	52	52	48
Female	48	48	52
Education			
Elementary	5	5	6
Lower vocational	35	36	32
Secondary and middle vocational	30	31	29
Higher vocational and academic	30	28	33
Partner status			
Living with a partner	68	70	64
Living without a partner	32	30	36
Occupational status			
Employed	71	71	69
Unemployed	29	29	31

range 18–65), education (1 = primary—lower vocational, 2 = secondary—intermediate vocational, 3 = higher vocational—academic), living with a partner (1 = yes, 0 = no), born in the Netherlands (1 = Netherlands, 0 = elsewhere), occupational status (1 = with a paid job, 0 = without), religion (1–7 = different types of religion, 8 = no religion) and urbanization (1 = living in urban environments, 0 = elsewhere).

Child maltreatment

Child maltreatment was defined as emotional neglect, psychological, physical as well as sexual abuse before the respondent reached the age of 16. Respondents were prompted to report these adversities with the help of questions such as "Before you reached the age of 16, were you ever: neglected emotionally? psychologically abused? physically abused? sexually abused?". During the interview, definitions for each type of abuse were given. Emotional neglect for instance was explained as follows: "(…) at home no one listened to you, your experiences and problems were ignored, you had the feeling that your parents were indifferent and did not support you." Answers were: "never", "once", "more than once" and "often". From experience, we know that people usually find it hard to disclose this type of personal and sensitive information in face-to-face interviews. In this context, the low cutoff between "never" and "once" was preferred, because higher thresholds would amplify the possible disclosure bias. Hence, the scale is dichotomized into the categories "never" and "at least once", which also helps to place our economic evaluation of child maltreatment on a more conservative footing. The joint exposure to more than two forms of maltreatment was translated into a new variable, called "multiple abuse". Another new variable was computed denoting "any abuse", when at least one type of abuse or neglect had occurred. The latter variable was used to report socioeconomic characteristics split by those groups who were or who were not abused as a child (see Table 1).

The concept of child maltreatment has multiple facets and different statistical analyses were used to account for these (see "Statistical analysis"). We hypothesized, that one form of child maltreatment often co-occurs in conjunction with another type or even several other types simultaneously. Sexual abuse for instance, is usually linked to emotional neglect and physical abuse. Therefore, we report both crude and adjusted estimates of abuse, i.e. with and without adjusting for concurrent types of abuse.

Parental psychopathology

Parental psychopathology was assessed using questions such as "Did your biological father ever suffer from depression?" Answers were either "Yes" (*1*) or "No" (*0*). When each of both parents showed at least one mental health problem, or one of the parents had two problems, we translated this into the variable "multiple parental problems". Some of the subsequent analyses were adjusted for these variables.

Mastery

Mastery, also known as internal locus of control, was measured using the abbreviated (five-item) version of the Pearlin Mastery Scale [20]. On a range from 1 to 5, higher scores indicate a stronger sense of mastery. We dichotomized the Mastery scale at the median to distinguish between "low" and "high" mastery (*1* equals a score above

the 50th percentile and *0* below the 50th percentile). We hypothesized that mastery would act as a protective factor. Hence, a high level of mastery in people with a history of maltreatment will significantly reduce the adverse impacts and hence the costs associated with childhood neglect and abuse. This effect modification can be understood in terms of the vulnerability–stress theory [28, 29], assuming a higher susceptibility to the adverse effects of a stressor (child maltreatment) in vulnerable individuals (with a low level of mastery). Several studies supporting this theory report a similar cushioning effect of mastery with regard to the risk of developing mental disorders [21–23]. In addition, it seems that mastery is amenable to change under psychological intervention [24, 25].

Costs

Several costs types were measured such as direct medical and direct non-medical costs, as well as costs that arise from production losses for both paid and unpaid work (indirect non-medical costs). The different cost types can be totalled into annual per-person costs, which is the outcome of interest in this study.

All cost prices for health-care uptake have been indexed to the year 2013 using the Dutch consumer price index at the Statistics Netherlands website [30]. The costs of production losses in paid labour were adapted using the wage index from 2008 to 2013 of 7.08 % [31]. Cost calculations were conducted in accordance with the Dutch guideline for health economic evaluations [32], which is similar to other international guidelines [33–35].

Direct medical costs

The use of mental health service was expressed in costs. The specific uptake (volume) of such services is recorded in NEMESIS by service type (e.g. general practitioner, social worker, psychologist, psychiatrist, outpatient and inpatient mental health care) and frequency of units (e.g. visits, contacts, consults, sessions, hospital days). These costs are calculated by multiplying the volumes with the standard cost prices from the Dutch guideline [32]. To these costs we added the costs of pharmacy use. Costs of pharmacy use are defined as the costs of a particular medication per standard daily dose [36] multiplied by the average number of prescription days, plus the GP's prescription costs, plus the pharmacist's dispensing costs of €6.44 per prescription [32].

Direct non-medical costs

When receiving treatment, patients will face travel and parking costs. These out-of-pocket costs are referred to as direct non-medical costs and are computed by multiplying the distance (in kilometres) to the respective health service by the cost prices per kilometre and adding parking costs [32].

Indirect non-medical costs

The costs of lost workdays was based on the average gender- and age-specific per-capita productivity in the Netherlands for the year 2013 as reported in the Dutch costing guideline [32]. In case an individual remained ill for several days, the appropriate gender- and age-specific productivity costs are multiplied by the number of lost workdays. These days are recorded in the NEMESIS dataset, and the corresponding cost calculations can thus be performed by multiplication. Unpaid work, such as production losses in the domestic sphere, were included as recommended by the Dutch guideline for health economic evaluations [32]. These were valued using a shadow price of €13.60 per hour, which equals the average wage of domestic help in the Netherlands in the year 2013 [37].

Statistical analysis

To account for the initial non-response and dropout, post-stratification weights were used. After weighting, the sample followed exactly the same multivariate distribution over age, sex, civil status and urbanization as the general population according to Statistics Netherlands [30].

To account for the non-normality of the cost data, we calculated sample errors, 95 % confidence intervals and *p* values with the help of non-parametric bootstrapping (1000 replications) as implemented in Stata version 12.1. For the remainder, the analyses were conducted in the following steps.

First, we estimated the average costs irrespective of exposure to child maltreatment. The mean costs were obtained with a weighted intercept—only generalized linear model.

Second, the effect of each form of child maltreatment was evaluated by regressing the various types of child maltreatment variables one by one on the costs. In this way, estimates of the excess costs were obtained related to each form of maltreatment. We refer to these costs as the unadjusted per-person excess costs. It should be noted that these costs are not adjusted for any concurrent type of abuse. The crude estimates presented for each type of abuse might therefore be an overestimate because they could have borrowed some of the costs of other forms of abuse (see example for sexual abuse and emotional neglect in "Child maltreatment".

Therefore, we also report the adjusted estimates of the cost that can be specifically attributed to a single type of abuse. To that end, the same procedure was repeated for every form of child maltreatment while adjusting for all remaining types of abuse, parental psychopathology and

Table 2 Average per-person excess costs of exposure to child maltreatment

Type of abuse	Unadjusted			Adjusted[a]		
	Excess costs per year	95 % CI[b]		Excess costs per year	95 % CI[b]	
		Lower	Upper		Lower	Upper
Emotional	€2306	1584	3029	€1360	615	2105
Psychological	€2939	1949	3930	€869	−252	1990
Physical	€2975	1693	4258	€1011	−372	2393
Sexual	€2659	1387	3932	€1591	261	2921
Multiple abuse	€3449	2424	4475	€2893	1919	3866

[a] Adjusted for all other forms of abuse, parental anxiety, parental depression and demographics

[b] 95 % CIs based on 1000 bootstrap replications

all socio-demographic variables listed earlier. We refer to these costs as the adjusted annual per-person excess costs.

It is worth noting that the crude estimates are realistic in the sense that that there exists none that has been the victim of a single ('pure') type of abuse, because one type of abuse is always concomitant with other types of abuse. However, when we want to estimate the costs that can be specifically attributed to a single type of abuse, then we must present the adjusted estimates.

Third, the per-person costs for those with low or high mastery were estimated. To this end, the adjusted annual per-person excess costs were multiplied by the number of people exposed to child maltreatment. To formally test the hypothesis that mastery is a significant effect modifier, a series of regression analyses were conducted with the appropriate interaction term of child maltreatment, mastery and their main effects while adjusting for parental psychopathology and demographics.

Finally, the adjusted annual excess costs were estimated at the population level. This followed the same procedure as in step three, except that here the adjusted annual per-person excess costs were multiplied by the prevalence of people exposed to the various types of abuse in every one million population. We refer to these costs as (adjusted) population level costs.

It should be noted that all forms of child maltreatment, mastery, parental psychopathology and the socio-demographic characteristics were measured at t_0, while the annual per-person costs were assessed 1 year later at the first follow-up (t_1), because the sequence of first 'cause' at t_0 and then 'effect' at t_1 strengthens the aetiological inference [27].

Results

Sample

The sample consisted of 5618 individuals with a mean age of 39.2 years. Of these, 32 % reported a history of child maltreatment. More specifically, 25 % of the sample reported emotional neglect, 1 % psychological abuse, 9 % physical abuse and 7 % sexual abuse. Furthermore, 32 % reported 'any abuse', which is less than the sum of all abuse types, because one type of abuse is often concomitant to another. Table 1 shows the socio-demographic characteristics of the sample split by the group that was or was not exposed to any type of abuse. In general, women were more often exposed to any type of abuse when compared with men; there is no clear relationship between exposure status and the level of attained education, but people with a history were more often living without a partner and more often unemployed.

Average costs

The average annual per-person health-related costs are €4049 (95 % CI = 3800–4298), irrespective of exposure status. There is no statistically significant difference in the costs between men (€3924; 3567–4281) and women (€4178; 95 % CI = 3820–4535; $t = -0.97$; $p = 0.330$).

Excess costs of child maltreatment at the individual level

Table 2 shows the annual per-person excess costs of being exposed to one of the forms of child maltreatment. In the left hand panel, the *unadjusted* costs are reported and these describe the excess costs of a person who reports being abused to one or another type of abuse—irrespective if there were concomitant forms of abuse. Thus, a person who reports sexual abuse has excess costs of €2659, but some of these costs may have been caused by concurred forms of abuse that also took place, perhaps as part of sexual abuse. After all, it is hard to conceive how sexual abuse could come about without involving some other form of abuse such as emotional neglect and physical abuse. In fact, most forms of abuse imply other forms of abuse (like Russian dolls that enclose each other) and it is hard to think of any

Table 3 Adjusted per-person costs for individuals with low and high mastery when exposed to child maltreatment

Type of abuse	Low mastery			High mastery			*p* value[a]
	Excess costs per year	95 % CI		Excess costs per year	95 % CI		
		Lower	Upper		Lower	Upper	
Emotional	€1608	445	2771	€474	−429	1377	0.009
Psychological	€597	−1035	2230	€704	−740	2148	0.035
Physical	€1774	−437	3985	€−447	−1696	803	0.184
Sexual	€2098	−97	4294	€626	−434	1686	0.182
Multiple abuse	€3642	2094	5190	€804	−104	1712	0.016

[a] *p* value of the test that the interaction effect of low vs high mastery on costs is significant

Table 4 Adjusted annual excess costs of child maltreatment per one million population costs[a]

Type of abuse	Exposure rates %	Costs in million per year	95 % CI[b]	
			Lower	Upper
Emotional	25	€341	−8	690
Psychological	13	€111	−312	535
Physical	9	€88	−344	519
Sexual	7	€111	−233	456
Multiple abuse	7	€395	13	776

[a] Adjusted for all other forms of abuse, parental anxiety, parental depression and demographics

[b] 95 % CIs based on 1000 bootstrap replications

type of abuse as something that could exist in isolation. Among the unadjusted costs of abuse, emotional neglect ranks lowest with €2306 and physical abuse highest with €2975.

The *adjusted* excess costs are corrected for all other forms of abuse, socio-demographic characteristics as well as for parental anxiety and parental depression. The adjusted costs help answer the question how much of the excess costs can be uniquely attributed to a specific type of abuse (as if there were types of abuse that are not correlated with concomitant forms of abuse). Now, psychological abuse ranks lowest and sexual abuse highest. However, none of the differences between the point estimates were statistically significant as can be deduced from the substantial overlap of the 95 % confidence intervals of the unadjusted and the adjusted estimates.

Excess costs modified by mastery

Table 3 shows how the costs of child maltreatment are modified by mastery. The costs of neglect and abuse increased when mastery was low and were considerably lower in the presence of a high level of mastery. Only for psychological abuse, this was not the case. The *p* values in Table 4 refer to the interaction term that captures the effect modification. The statistical model shows that a 20 % improvement on the mastery scale is mirrored by a cost reduction of €4177 (95 % CI = 3031–5234) per year.

Excess costs of child maltreatment at the population level

Table 4 presents that the costs of child maltreatment are equal to the adjusted per-person costs multiplied by the number of people exposed to the respective type of child maltreatment. In every one million people, the excess costs of childhood neglect and abuse vary between €88 million for sexual abuse to €395 million for multiple abuses per year.

Discussion

Main findings

The results of this study show that child maltreatment occurs frequently and is associated with substantial excess costs in adulthood. The mean annual adjusted excess costs range between €869 and €2893 per abused person, depending on the type of child maltreatment.

Depending on the estimated exposure rates, the annual societal costs at population level range between €88 million and €395 million per one million individuals aged between 18 and 65 years.

Exposure rates in the sample ranged from 7 % for sexual abuse to 25 % for emotional neglect. A recent meta-analysis on worldwide prevalence rates of child sexual abuse (CSA) reported prevalence estimates ranging from 8 to 31 % for girls and 17 % for boys [38] indicating that our estimates of the prevalence of sexual abuse are somewhat lower. Another meta-analysis on the prevalence of self-reported emotional neglect suggests a prevalence of 18.4 % (95 % CI = 13.0–25.4) [39]. Our estimate of 25 % thus falls in the upper range of the confidence interval reported in the latter study. Our cost estimates were consistent with findings

from a retrospective cohort study in the USA among 3333 women [40]. In the US study, it was found that the annual health-care costs were significantly higher in women with a history of abuse when compared with those without abuse. We converted and indexed the US dollars to 2013 euros and obtained very comparable outcomes: the unadjusted costs are €2787 for physical child abuse (€2975 in our study) and €2672 for sexual abuse (€2659 in our study) [40].

As hypothesized, it appears that the level of mastery has a significant impact on the subsequent costs. With the exception of psychological abuse, the costs of child maltreatment were much higher when people have a sense of mastery that is below average. However, when a sense of mastery was relatively strong, then the excess costs due to child maltreatment were less than one-third. This gives some weight to the hypothesis that savings may be generated if a mastery-enhancing intervention would be found.

Strengths and limitations

This study has several strengths and limitations that need to be considered. Data on the occurrence of child maltreatment and subsequent economic costs were assessed in a large epidemiological cohort study representative of the population of 18–65 years in the Netherlands. The cost calculations included direct medical, direct non-medical and indirect costs due to absenteeism and these costs could be adjusted for socio-demographic characteristics and parental psychopathology.

All costs should be interpreted as conservative estimates. First, individuals receiving inpatient care may have been underrepresented in our study, while hospital stays are known to be a major cost driver [41]. Second, the direct medical costs were restricted to mental health services and prescription drugs for mental disorders. Yet, it is well known that mental disorders also generate costs outside the mental health-care sector [42]. Third, all cost calculations are based on self-reported medical consumption, which is known to underestimate health service use [43]. Finally, apart from work loss days due to absenteeism, work cutback (lesser efficiency while at work when not feeling well) will also result in production losses. The latter were not included in this study and can be substantial [44–46]. Therefore, the costs estimates are best viewed as lower bounds of the true costs.

The data were derived from a naturalistic psychiatric cohort study and our cost estimates may therefore have been biased by confounding. While we could adjust for some potential confounders (such as parental psychopathology), our estimates may have been further confounded by unobserved covariates.

Despite the large sample, the 95 % confidence intervals around the cost estimates are broad. This is a common finding in health economic studies, because cost data typically have large standard errors. Moreover, the measures on parental psychopathology are not the most precise, since they were based on the subjective assessments of the study's participants. In general, measurement errors are likely to attenuate the correlation between child maltreatment and costs, which increases the likelihood that costs have been underestimated rather than overestimated.

The interpretation of mastery as an effect modifier requires caution. After all, a relatively low sense of mastery might have been caused by childhood adversity, such that a lower level of mastery might reflect more severe levels of child maltreatment, in which case mastery is not only an effect modifier but also a consequence of child maltreatment. In other words, the aetiological role of mastery in the pathway between child maltreatment and the economic costs attributable to child maltreatment might be a fairly complex one. Moreover, we could not observe if a change in mastery is followed by a subsequent change in costs. Hence, one must be careful when drawing conclusions from between-subject differences about within-subject longitudinal changes, and it is only the latter that is interesting from a clinical perspective. Therefore, we recommend that the effect modification hypothesis needs further testing in an economic evaluation in a prospective controlled randomized trial of a mastery enhancing intervention in people with a history of child maltreatment.

Implications

Since child maltreatment has profound economic consequences, we can make the economic case for taking action. After all, child maltreatment is associated with staggering long-term economic costs, rendering a lack of action very costly. Moreover, our data lend credibility to the hypothesis that a protective factor such as mastery may help to cushion the adverse consequences of child maltreatment.

Further research on mastery as a protective factor might show a way to ameliorate the adverse consequences of child maltreatment. Such an endeavour would be intrinsically worthwhile and may, in addition, offer economic benefits.

Conflict of interest On behalf of all authors, the corresponding author states that there is no conflict of interest.

Ethical standard This study has been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments.

References

1. UNICEF (1990) United Nations convention on the Rights of the Child. http://www.unicef.org/crc/. Accessed 13 Nov 2014

2. Gilbert R, Widom CS, Browne K, Fergusson D, Webb E, Janson S (2009) Burden and consequences of child maltreatment in high-income countries. The Lancet 373(9657):68–81
3. Oosterlee A, Vink RM, Smit F (2009) Prevalence of family violence in adults and children: estimates using the capture-recapture method. Eur J Public Health 19(6):586–591
4. Woodman J, Pitt M, Wentz R, Taylor B, Hodes D, Gilbert RE (2008) Performance of screening tests for child physical abuse in accident and emergency departments. Health Technol Assess 12(33):iii, xi–xii 1–95
5. Machado C, Gonçalves M, Matos M, Dias AR (2007) Child and partner abuse: self-reported prevalence and attitudes in the north of Portugal. Child Abuse Negl 31(6):657–670
6. Andrews G, Corry J, Slade T, Issikadis C, Swanston H. (2004) Child sexual abuse. Comparative quantification of health risks. In: Ezzati M, Lopez AD, Rodgers A, Murray CJL (ed) global and regional burden of disease attributable to selected major risk factors. WHO: 2:1851–1940
7. Cuijpers P, Smit F, Unger F, Stikkelbroek Y, Ten Have M, De Graaf R (2011) The disease burden of childhood adversities in adults. Child Abuse Negl 35:937–945
8. Kessler RC, Davis CG, Kendler KS (1997) Childhood adversity and adult psychiatric disorder in the US National Comorbidity Survey. Psychol Med 27(05):1101–1119
9. Merikangas KR, Stevens DE, Fenton B, Stolar M, O'malley S, Woods SW et al (1998) Co-morbidity and familial aggregation of alcoholism and anxiety disorders. Psychol Med 28(04):773–788
10. Bijl RV, Cuijpers P, Smit F (2002) Psychiatric disorders in adult children of parents with a history of psychopathology. Soc Psychiatry Psychiatr Epidemiol 37(1):7–12
11. De Graaf R, Bijl RV, Ravelli A, Smit F, Vollebergh WAM (2002) Predictors of first incidence of DSM-III-R psychiatric disorders in the general population: findings from the Netherlands Mental Health Survey and Incidence Study. Acta Psychiatr Scand 106(4):303–313
12. De Graaf R, Bijl RV, Smit F, Vollebergh WAM, Spijker J (2002) Risk factor profiles of 12-month comorbidity of mood, anxiety and substance use disorders: findings from the Netherlands Mental Health Survey and Incidence Study. Am J Psychiatry 159:620–629
13. Spataro J, Mullen PE, Burgess PM, Wells DL, Moss SA (2004) Impact of child sexual abuse on mental health Prospective study in males and females. Br J Psychiatry 184(5):416–421
14. Gilbert R, Widom CS, Browne K, Fergusson D, Webb E, Janson S (2009) Burden and consequences of child maltreatment in high-income countries. The Lancet 373(9657):68–81
15. Leeb RT, Lewis T, Zolotor AJ (2011) A review of physical and mental health consequences of child abuse and neglect and implications for practice. Am J Lifestyle Med 5(5):454–468
16. Leinonen JA, Solantaus TS, Punamäki RL (2003) Social support and the quality of parenting under economic pressure and workload in Finland: the role of family structure and parental gender. J Fam Psychol 17(3):409–418
17. Dunn MG, Tarter RE, Mezzich AC, Vanyukov M, Kirisci L, Kirillova G (2002) Origins and consequences of child neglect in substance abuse families. Clin Psychol Rev 22(7):1063–1090
18. Fleming J, Mullen P, Bammer G (1997) A study of potential risk factors for sexual abuse in childhood. Child Abuse Negl 21(1):49–58
19. Sachs-Ericsson N, Keel PK, Holland L, Selby EA, Verona E, Cougle JR et al (2012) Parental disorders, childhood abuse, and binge eating in a large community sample. Int J Eat Disord 45(3):316–325
20. Pearlin LI, Schooler C. (1978) The structure of coping. J health social behav 2-21
21. Katz IR, Streim J, Parmelee P (1994) Prevention of depression, recurrences, and complications in late life. Prev med 23(5):743–750
22. Ormel J, Stewart R, Sanderman R (1989) Personality as modifier of the life change-distress relationship. Soc Psychiatry Psychiatr Epidemiol 24(4):187–195
23. Zarit SH, Femia EE, Gatz M, Johansson B (1999) Prevalence, incidence and correlates of depression in the oldest old: the OCTO study. Aging Mental Health 3(2):119–128
24. McCullough J (1980) Helping depressed patients regain control over their lives. Behav Med 7:33–34
25. McCullough J (2005) Cognitive behavioral analysis systyem of psychotherapy: treatment for chronic depression. In: Norcross J, Goldfried M (eds) Handbook of psychotherapy integration, 2nd edn. Oxford University Press, London, pp 281–298
26. Bijl RV, Van Zessen G, Ravelli A, De Rijk C, Langendoen Y (1998) The Netherlands mental health survey and incidence study (NEMESIS): objectives and design. Soc Psychiatry Psychiatr Epidemiol 33(12):581–586
27. de Graaf R, Bijl RV, Smit F, Ravelli A, Vollebergh WA (2000) Psychiatric and sociodemographic predictors of attrition in a longitudinal study. The Netherlands Mental Health Survey and Incidence Study (NEMESIS). Am J Epidemiol 152(11):1039–1047
28. Brown GW, Harris T (1978) Social origins of depression: a reply. Psychol Med 8(04):577–588
29. Harris T (2006) Where inner and outer worlds meet: psychosocial research in the tradition of George W Brown. Routledge, Abingdon
30. Centraal Bureau voor de Statistiek (2014) Consumer prices. http://statline.cbs.nl/Statweb/publication/?DM=SLEN&PA=71311eng&D1=0-&D2=0&D3=103%2c116%2c129%2c142%2c155%2c168%2c181%2c194%2c217-256&LA=EN&HDR=G1%2cT%2cG2&VW=T. Accessed 13 Nov 2014
31. Centraal Bureau voor de Statistiek (2015) Cao wages, contractual wage costs and working hours; (2000 = 100), 2000–2014. http://statline.cbs.nl/StatWeb/publication/?PA=70640eng&LA=EN. Accessed 13 Nov 2014
32. Hakkaart-van Roijen L, Tan SS, Bouwmans CAM. (2010) Handleiding voor kostenonderzoek: Methoden en standaard kostprijzen voor economische evaluaties in de gezondheidszorg. Institute of Medical Technology Assessment, Rotterdam
33. Langley PC (1996) The November 1995 revised Australian guidelines for the economic evaluation of pharmaceuticals. Pharmaco Economics 9(4):341–352
34. Siegel JE, Torrance GW, Russell LB, Luce BR, Weinstein MC, Gold MR (1997) Guidelines for pharmacoeconomic studies. Pharmaco Economics 11(2):159–168
35. Torrance GW, Blaker D, Detsky A, Kennedy W, Schubert F, Menon D et al (1996) Canadian guidelines for economic evaluation of pharmaceuticals. Pharmaco Economics 9(6):535–559
36. Zorginstituut Nederland (2014) Pharmacotherapeutic compass. http://www.farmacotherapeutischkompas.nl. Accessed 13 Nov 2014
37. CAK (2013) Eigen bijdrage. Zorg zonder Verblijf en Wmo 2013.https://www.hetcak.nl/portalserver/stream/cak-klanten/2-zorg-thuis/2-12-downloads/CAK-folder-ZzV-2013.pdf. Accessed 13 Nov 2014
38. Barth J, Bermetz L, Heim E, Trelle S, Tonia T (2013) The current prevalence of child sexual abuse worldwide: a systematic review and meta-analysis. Int J Public Health 58(3):469–483
39. Stoltenborgh M, Bakermans-Kranenburg MJ, van IJzendoorn MH (2013) The neglect of child neglect: a meta-analytic review of the prevalence of neglect. Soc Psychiatry Psychiatr Epidemiol 48(3):345–355
40. Bonomi AE, Anderson ML, Rivara FP, Cannon EA, Fishman PA, Carrell D et al (2008) Health care utilization and costs associated with childhood abuse. J Gen Intern Med 23(3):294–299

41. Berto P, D'Ilario D, Ruffo P, Virgilio RD, Rizzo F (2000) Depression: cost-of-illness studies in the international literature, a review. J Ment Health Policy Econ 3(1):3–10
42. Greenberg PE, Birnbaum HG (2005) The economic burden of depression in the US: societal and patient perspectives. Expert Opin Pharmacother 6(3):369–376
43. van den Brink M, van den Hout WB, Stiggelbout AM, van de Velde CJ, Kievit J (2004) Cost measurement in economic evaluations of health care: whom to ask? Med care 42(8):740–746
44. De Graaf R, Tuithof M, Van Dorsselear S, Ten Have M (2012) Comparing the effects on work performance of mental and physical disorders. Soc Psychiatry Psychiatr Epidemiol 47:1873–1883
45. Kessler RC, Frank RG (1997) The impact of psychiatric disorders on work loss days. Psychol Med 27(04):861–873
46. Lim D, Sanderson K, Andrews G (2000) Lost productivity among full-time workers with mental disorders. J Ment Health Policy Econ 3(3):139–146